PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH
COLUMBIA

A Reconnaissance Survey Of Blue Lake

M. J. Hunter
March 1997

PWFWCP Report No. 167

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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105-02070/

A RECONNAISSANCE SURVEY OF

BLUE LAKE

WATERSHED:	**Williston Reservoir (Parsnip Reach)**
DATE OF SURVEY:	**October 8 - 9,1996**
FIELD CREW LEADER:	**Mark Hunter**
FIELD ASSISTANT:	**Karin Mathias**
REPORT PREPARED BY:	**Mark Hunter**

BRITISH COLUMBIA CONSERVATION FOUNDATION

PEACE / WILLISTON FISH AND WILDLIFE COMPENSATION PROGRAM

B. C. MINISTRY OF ENVIRONMENT, LANDS AND PARKS

FUNDED BY: FOREST RENEWAL BRITISH COLUMBIA

RELEASED BY: _____

D. J. Cadden, Regional Fisheries Biologist

LAKE: Blue Lake **SYSTEM NAME: N/A**

A.S.A.P. REFERENCE NO.: **WATERSHED CODE.: 230-9068-556-110**

DATA ON FILE FOR THIS SURVEY

Location	X	Dissolved 02 / Temp. Profiles	X
Physical Data	X	Winter Dissolved 02 / Temp. Profiles	--
Bench Mark	X	Netting Record	X
Terrain Features	X	Lake Catch Summary	X
Access	X	Individual Fish Data	--
Resorts and Campsites	X	Fish Preserved	--
Other Developments	X	Stomach Analysis	--
Obstructions and Pollutions	X	Scale Reading	--
Special Restrictions	X	Location of Inventory Sites	X
Aquatic Plants	X	Photograph Directory	X
Wildlife Observations	X	Appendices	
Miscellaneous Comments	X	A: Water Chemistry Analysis	X
Lake Drainage	X	B: Tributary Stream Data	--
Fisheries Management Comments	X	C: Fish Scale Analysis	--
History of Previous Surveys	X	Bathymetric Map Reduction	X
Water Chemistry Summary	X	Bathymetric Map	--

LOCATION

Location:	approximately 37 km south of Mackenzie		
Elevation:	740m ± 10m	U.T.M.:	10.470417.6230723
Latitude / Longitude:	54°57'41" 123°04'52"	N.T.S. Map No.:	93 - J / 14 & 93 - 0 / 9
Management Unit:	7-24	Biogeoclimatic Zone:	Sub-Boreal Spruce
Ecoprovince:	Sub-Boreal Interior	Ecoregion:	Fraser Basin
Ecosection:	Nechako Lowlands		

Drainage: N/A

PHYSICAL DATA

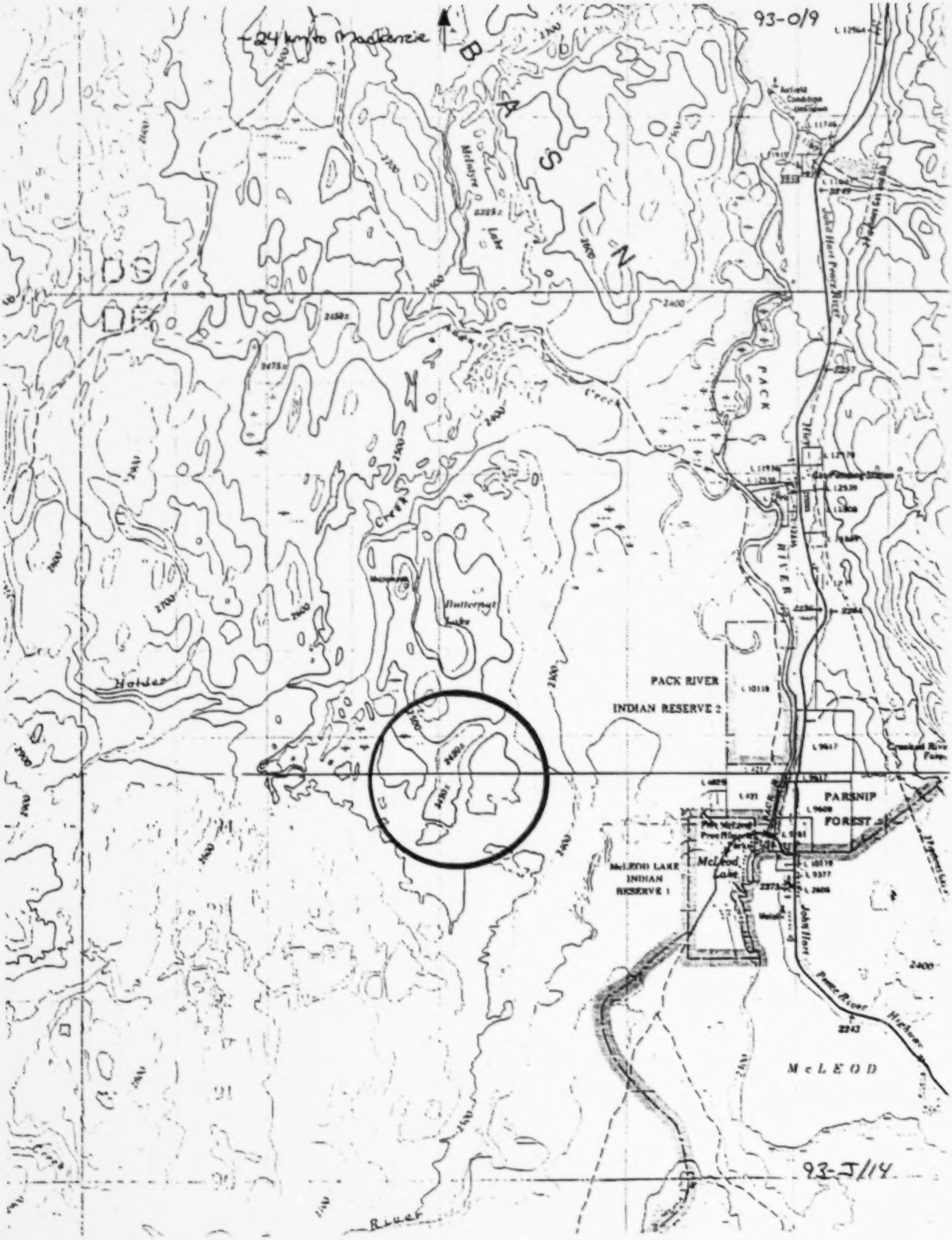
Lake Drainage Area:	0.0 km^2	Volume:	1 453 307 m^3
Water Surface Area:	305 463 m^2	Perimeter of Islands:	0 m
Area Above 6 m Contour:	197 422 m^2	Number of Islands:	0
Shoreline Perimeter:	3 118m	Mean Depth:	4.8m
Maximum Depth:	15.0 m	Secchi Reading:	4.3 m
Filterable Residue (TDS):	30 mg/L		

Sounding Device: Lowrance X-15 Elevation Source: Contour Interpolation

BENCHMARK

(Iron spike, center of red circle) located 2.0 m above present water level in a 34 cm diameter lodgepole pine tree that is 5.3 m from the present water's edge and located on the southeast shore of the lake, approximately 40 m north of the swamp in the south end of the lake (Plate # 4).

High Water Mark: 0.24 m above water level at time of survey


+24 km to Mackenzie
93-O/9
BASSIN
Mcintyre Lake
Hutterpot Lake
Hutter
PACK RIVER
INDIAN RESERVE 2
PARSNIP
FOREST
McLeod Lake
McLEOD LAKE
INDIAN
RESERVE 1
John Hart Prince River
Prince River Highway
McLEOD
93-J/14

LAKE: Blue Lake

TERRAIN FEATURES

Immediate Shoreline:

Blue Lake is almost entirely surrounded by a growth of sedge grasses and alders. Spruce, lodgepole pine, fir and trembling aspen trees grow on steep slopes behind the shoreline growth on steep hill along the south, west, north and north east side of the lake. Common juniper, Labrador tea and blueberries grow amongst the trees. From the middle of the east side, spruce, lodgepole pine and fir trees grow on a slope that steadily decreases to relatively flat lands along the southern part of the east shore. The exception to this is a small sedge grass marsh located in the southeast comer of Blue Lake, that has spruce, lodgepole pine and fir trees growing on a moderately steep slope behind.

The shoreline substrate in front of the marsh is composed of silts and organics. The substrate around the rest of the lake is composed of hard-packed fines with some gravels and small cobble off the point of land on the east side of the lake. Three beaver huts are located on the lake; one on both the east and west sides of Blue Lake, and one in the northeast end of the lake (Plates # 5). There is a large amount of fallen trees along the entire lake's edge, some of which have been fallen by beavers. As well, there are many submerged and half-submerged logs in the northeast bay of Blue Lake. A cabin with a dock is located on the point of land on the east side of the lake (Plate # 6).

Surrounding Country:

Blue Lake is surrounded on all sides by a mature forest of spruce, lodgepole pine, fir and aspen trees growing on gently rolling hills. Two clear cuts are located near Blue Lake; one is approximately 0.5 km to the southeast, and the other is approximately 1 km to the south-southwest. Blue Lake is situated within the Sub-Boreal Spruce biogeoclimatic zone.

LAKE: Blue Lake

ACCESS

Directions:

From it's junction with Highway 39, drive south on Highway 97 for approximately 1.5 km and turn right on to the Finlay Forest Service Road. Travel north for approximately 12 km, then turn left on to the Tudyah Main Line and proceed for approximately 2 km. Turn right on to the Sabai Main Line and drive for approximately 3 km, then turn left. Proceed along the Holder Main Line for approximately 13.25 km. Turn left on to a side road and drive approximately 2 km to a clear cut. The total distance from the junction of Highway 97 and Highway 39 to the clear cut is approximately 33.75 km From the clear cut, Blue Lake is approximately a 3 km helicopter ride to the northeast.

Road Type and Conditions:

Highway 97 is a well-maintained, two-lane paved highway. The Finlay Forest Service Road and all three Main Lines are well-maintained, two-lane gravel logging roads that can easily be traveled with a two-wheel drive vehicle. The Side road that leads to the clear cut is a maintained, one-lane gravel logging road that can be easily traveled with a two-wheel drive truck.

Restrictions:

Although there are no restrictions, it is recommended that a truck radio be used when traveling the Forest Service Road and the logging roads.

RESORTS AND CAMPSITES

None noted.

OTHER DEVELOPMENTS

There was a cabin belonging to Mr. Rick Johnstone, who lives in Mackenzie ((250) 997-5538) located on the point of land on the east side of the lake. A notice left on the door indicates that anybody can use the cabin as long they do not abuse it. Along with the cabin, there is a dock, an outhouse and a gas generator.

LAKE: Blue Lake

OBSTRUCTIONS AND POLLUTIONS

There were large amounts of fallen trees around the edge of the lake, and a large number of dead-heads in the northeast end of the lake, that could be hazardous to boaters.

SPECIAL RESTRICTIONS

None known.

AQUATIC PLANTS

The following aquatic plants were identified during the time of the survey:

sedge grasses Equisetum

WILDLIFE OBSERVATIONS

The following wildlife or signs were seen during the time of the survey:

moose droppings beaver chews
muskrat

MISCELLANEOUS COMMENTS

1) The best location for landing a helicopter is on the west side of the lake. However, there appears to be a trail that leads into Blue Lake beside the cabin located on the east side of the lake. Where this trail comes out is unknown as there was not enough time during the survey period to follow it.

2) Bathymetric map: The lake outline was drawn from an enlargement of air photo 30 BCB 94066: No. 026, flown August 28, 1994.

LAKE: Blue Lake

LAKE DRAINAGE

General:

Blue Lake is a land-locked lake with no inlets or outlet.

Major Systems:

There are no major systems.

Minor Systems:

There are no minor systems.

FISHERIES MANAGEMENT COMMENTS

Blue Lake is a land-locked lake. It is unknown how the population of longnose suckers was established in the lake, but the population appears to be very productive. The lake was deep (14.75 m) and the oxygen / temperature profile indicates that there is more than sufficient levels of dissolved oxygen to support a population of fish. As well, the pH level, which averaged 7.08 (lab), is also suitable for the survival of a fish population. If a Forest Recreation Site was to be built on the shore of Blue Lake, building it in the north end of the lake would limit the solitude and beauty of the lone cabin. As the lake has no outlet, it could be stocked with a population of rainbow trout or eastern brook trout; however, either yearly or bi-yearly stocking would be required to maintain the population.

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

None known.

Other Related Studies:

None known.

LAKE: Blue Lake

WATER CHEMISTRY SUMMARY **Limnology Station No. 1**

Field Conditions:

Date:	October 9, 1996		
Time:	1100 hrs	Air Temperature:	12.0 °C
Wind Velocity:	2 - 3 km/h	Wind Direction:	from the S
Cloud Cover:	10 / 10 o.c.	Surface Conditions:	large ripples
Secchi Disc:	4.3 m	Water Colour:	cloudy with no noticeable colour

Method Used:

Dissolved Oxygen:	YSI Model 57 Oxygen / Temperature Meter
Water Temperature:	YSI Model 57 Oxygen / Temperature Meter
Air Temperature:	Hand-Held Alcohol Thermometer
pH (field):	Digital pH Pocket Tester
H2S (field):	Hach H2S Field Test Kit
Laboratory Used:	Pacific Environmental Science Center
Water Sampler:	Vertical Alpha Water Bottle (Vandorn)
Metal Sampler:	By Hand; Preserved With 2.0 mL Nitric Acid
Substrate Sampler:	Substrate Sample Not Taken

Water Sample Chemistry: **SEAM Site No.:** E 223190

	Sampling Depths	
	Surface (0.5 m)	Lower (14.0 ml
Alkalinity (lab)	24.5 mg / L	31.1 mg / L
Filterable Residue 105°C (lab)	30 mg / L	30 mg / L
H2S (field)	N/A	0.0 mg / L
Nitrogen - Total (lab)	0.26 mg / L	2.0 mg / L
Non-Filterable Residue (lab)	< 5 mg / L	13 mg / L
pH (field)	7.4	7.4
pH (lab)	7.55	6.63
Phosphorus - Total Dissolved (lab)	< 0.002 mg / L	< 0.004 mg / L
Specific Conductance (lab)	52 µS / cm	66 µS / cm

Bottom Depth: 15.0 m

Substrate Sample Depth: N/A

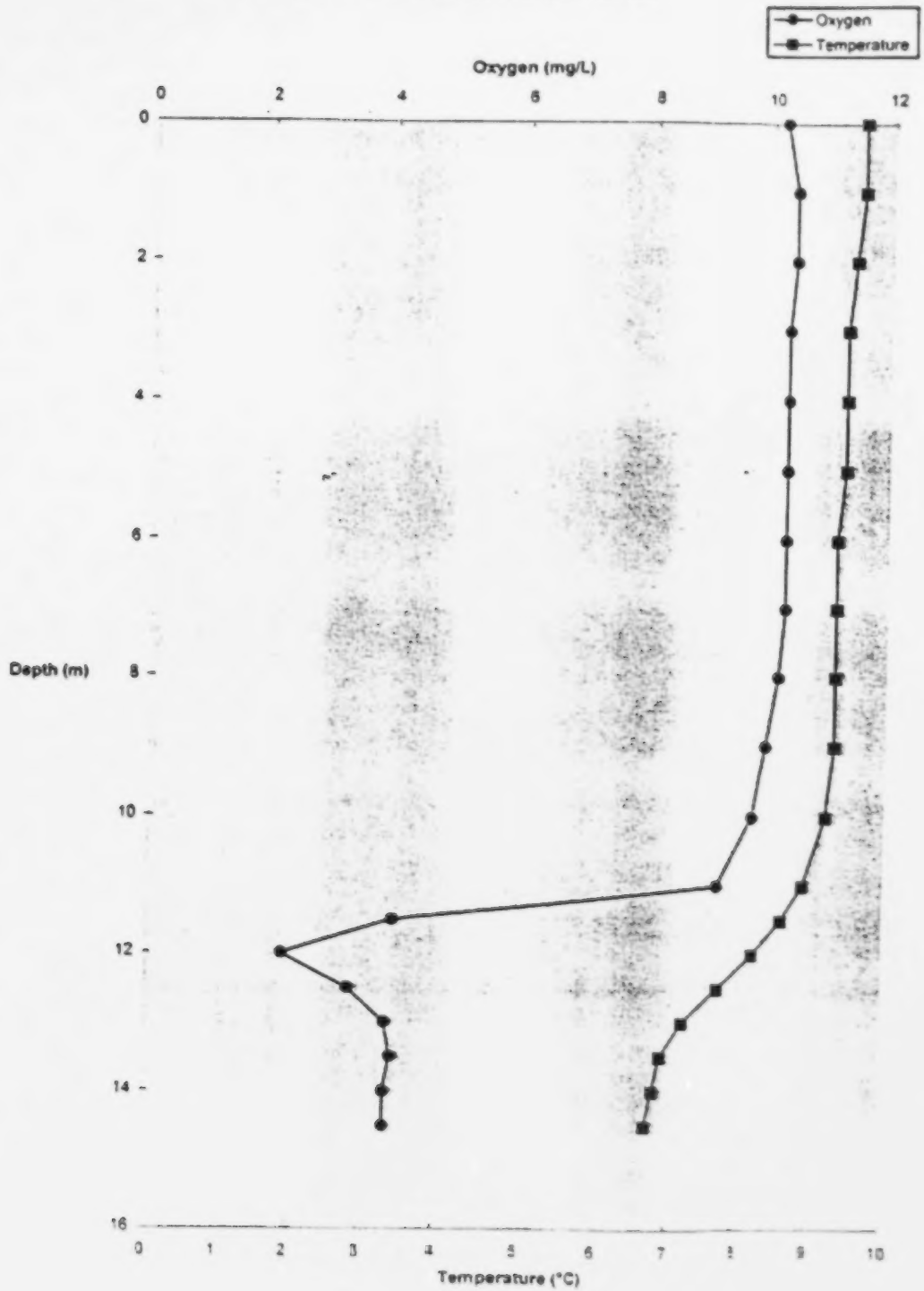
* additional analyzed parameters and results, including metals, are found in Appendix 1

LAKE: Blue Lake

FALL OXYGEN / TEMPERATURE DATA

DEPTH (m)	02 (mg/L)	TEMPERATURE (°C)
Surface	10.2	9.6
1.0	10.4	9.6
2.0	10.4	9.5
3.0	10.3	9.4
4.0	10.3	9.4
5.0	10.3	9.4
6.0	10.3	9.3
7.0	10.3	9.3
8.0	10.2	9.3
9.0	10.0	9.3
10.0	9.8	9.2
11.0	9.2	8.9
11.5	4.1	8.6
12.0	2.3	8.2
12.5	3.4	7.7
13.0	4.0	7.2
13.5	4.1	6.9
14.0	4.0	6.8
14.5	4.0	6.7
15.0	Bottom	

FALL OXYGEN / TEMPERATURE PROFILE



LAKE: Blue Lake

NETTING RECORD

Mesh Size Experimental Order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE # 1

Type:	Sinking Monofilament Gill Net			
Date Set:	October 8, 1996		Time:	1704 hrs
Date Lifted:	October 9, 1996		Time:	1003 hrs
Net Dimensions:	Length:	91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm		Depth:	0.8 m
			Substrate:	sand
Deep End Mesh Size:	64 mm		Depth:	6.0 m
			Substrate:	silt / organics

Comments: The net started approximately 4.0 m out from the shore.

LAKE CATCH SUMMARY

Species	Netting Site No. I	Angled	Other	Total	Number Sampled	Number Preserved	Size Range (cm)
LSU	241	0	0	241	0	0	11.1-31.8

Minnow Traps:

Bait: Sardines

Trap No.	Hours	Depth (m)	Substrate	Species	No. Caught	Size Range (cm)
1	15:54	0.9	sand with woody debris	LSU	36	6.3-11.1
2	16:06	1.0	sand with LWD	LSU	40	6.6-13.0
3	16:09	1.0	silt / organics with LWD	LSU beetle	9 1	6.1-11.0
4	16:08	1.0	sand with LWD	LSU	11	6.6-10.5

LS
1
2
3
NS
1
6
C
4
LOCATION OF INVENTORY SITES
Benchmark
1
Stream Number And Direction Of Flow
NS
Net Set Number And Site
LS
Limnostation Number And Site
1
Plate Number And Direction Of Photograph
C
Cabin

LAKE: Blue Lake

PHOTOGRAPH DIRECTORY

Plate	Roll : Number	Description
1	35: 23	Aerial view of Blue Lake looking north.
2	35: 17 - 19	Panoramic view of Blue Lake looking north from the center of the lake.
3	35: 14 - 16	Panoramic view of Blue Lake looking south from the center of the lake.
4	35: 10	View of the benchmark located 2.0 m above present water level in a 34 cm diameter lodgepole pine tree that is 5.3 m from the present water's edge and located on the southeast shore of the lake, approximately 40 m north of the swamp in the south end of the lake.
5	35: 13	View of beaver hut # 1 located on the east side of Blue Lake.
6	35: 20	View of the cabin and dock located on the point of land on the east side of Blue Lake.

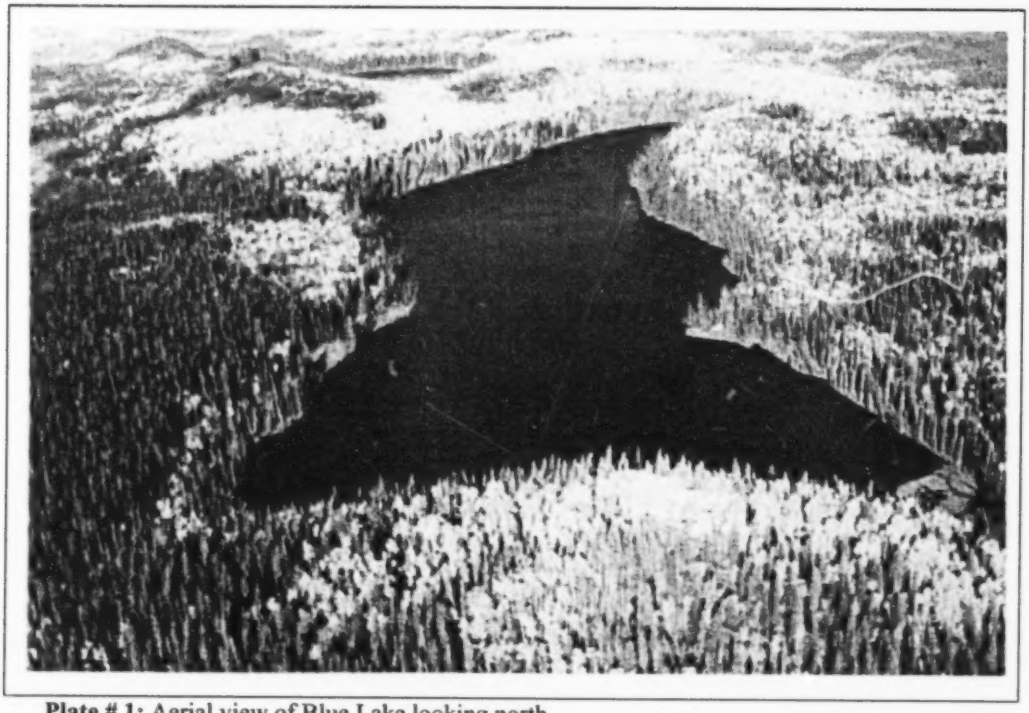


Plate # 1: Aerial view of Blue Lake looking north.

LAKE: Blue Lake

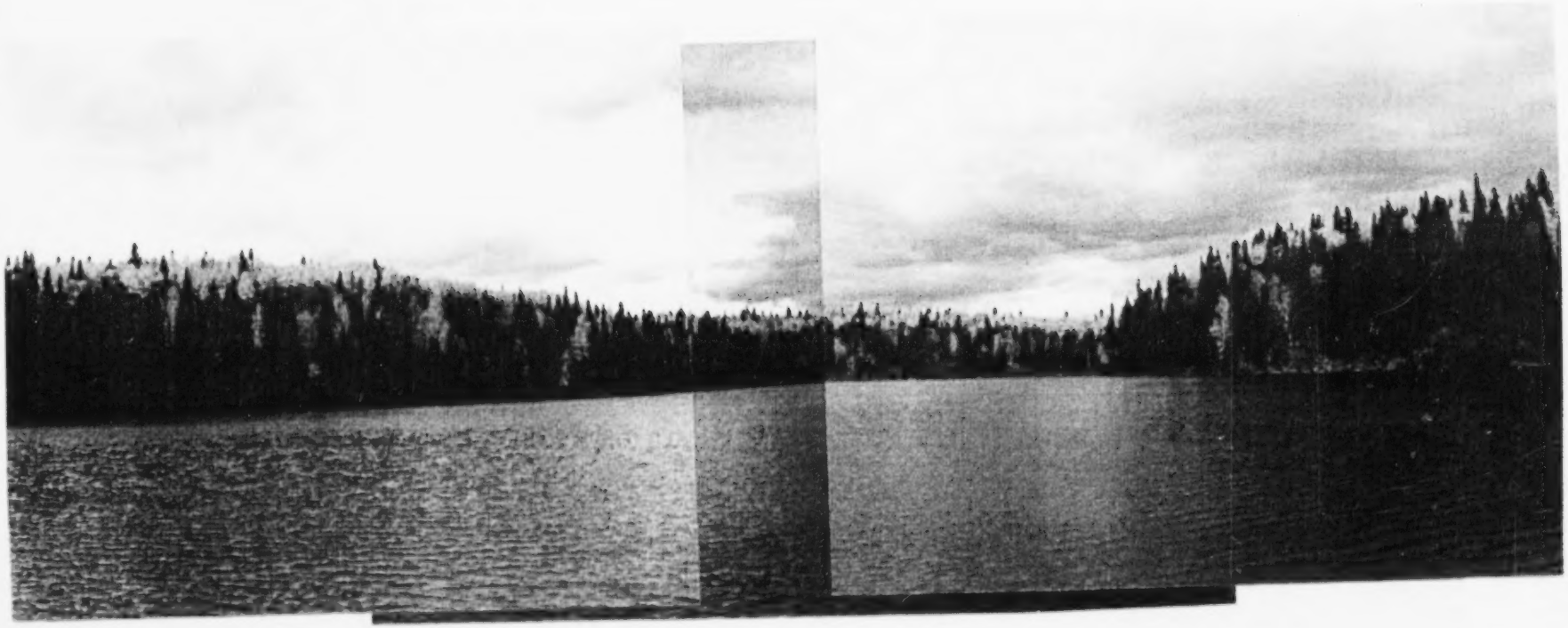


Plate # 2: Panoramic view of Blue Lake looking north from the center of the lake.

Plate # 3: Panoramic view of Blue Lake looking south from the center of the lake.

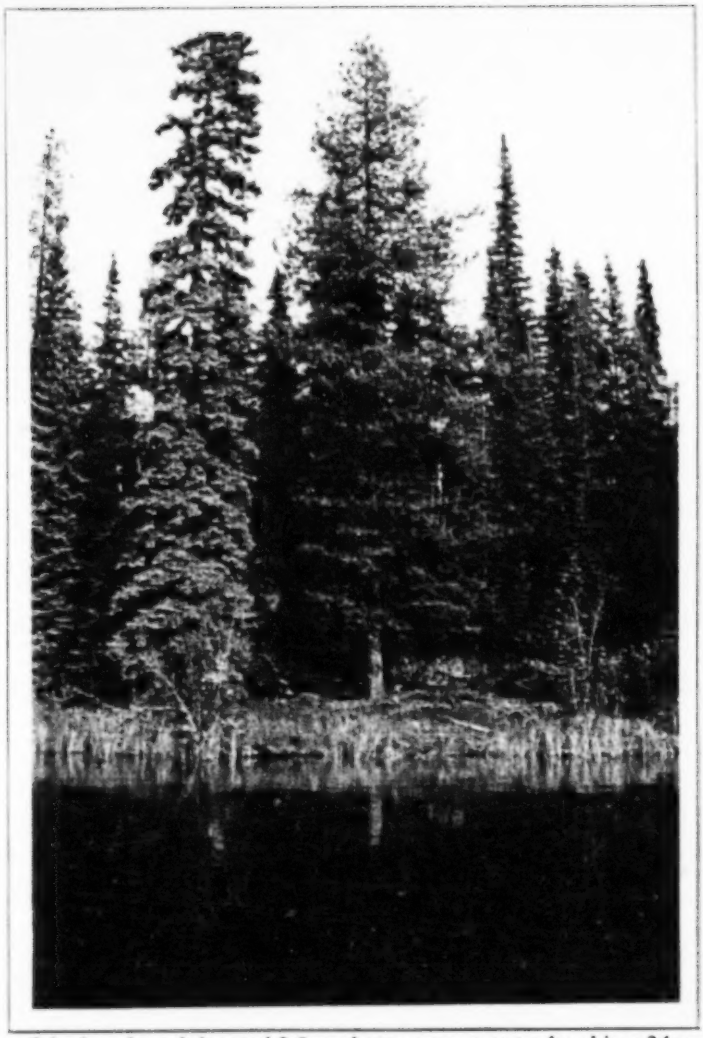


Plate # 4: View of the benchmark located 2.0 m above present water level in a 34 cm diameter lodgepole pine tree that is 5.3 m from the present water's edge and located on the southeast shore of the lake, approximately 40 m north f the swamp in the south end of the lake.

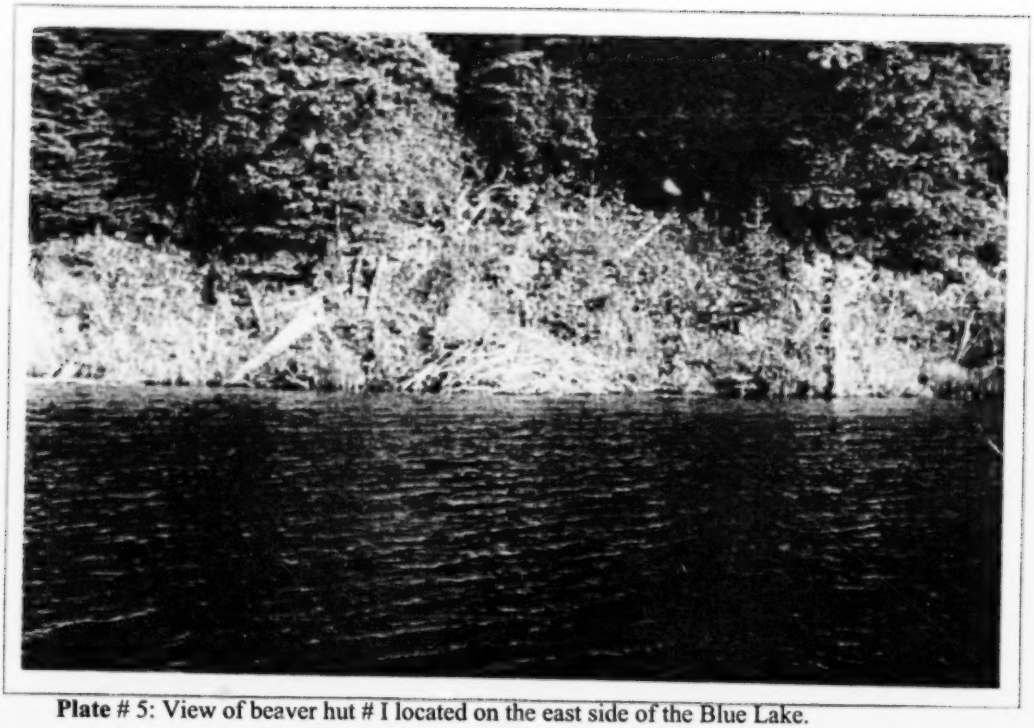


Plate # 5: View of beaver hut # I located on the east side of the Blue Lake.

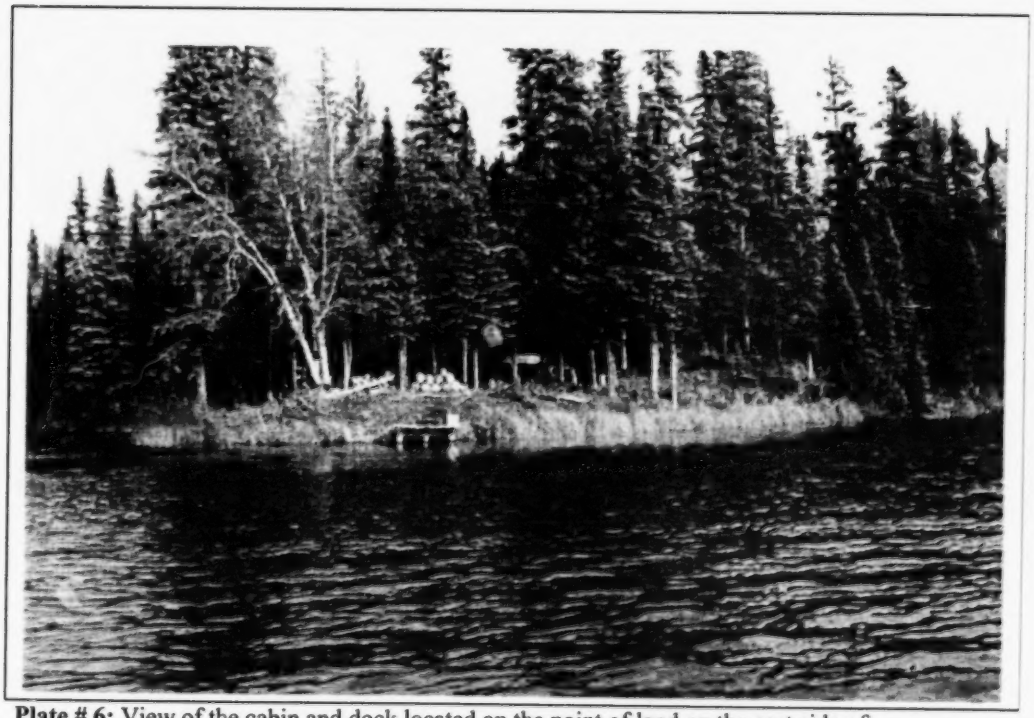


Plate # 6: View of the cabin and dock located on the point of land on the east side of Blue Lake.

Appendix A

LABORATORY REPORT

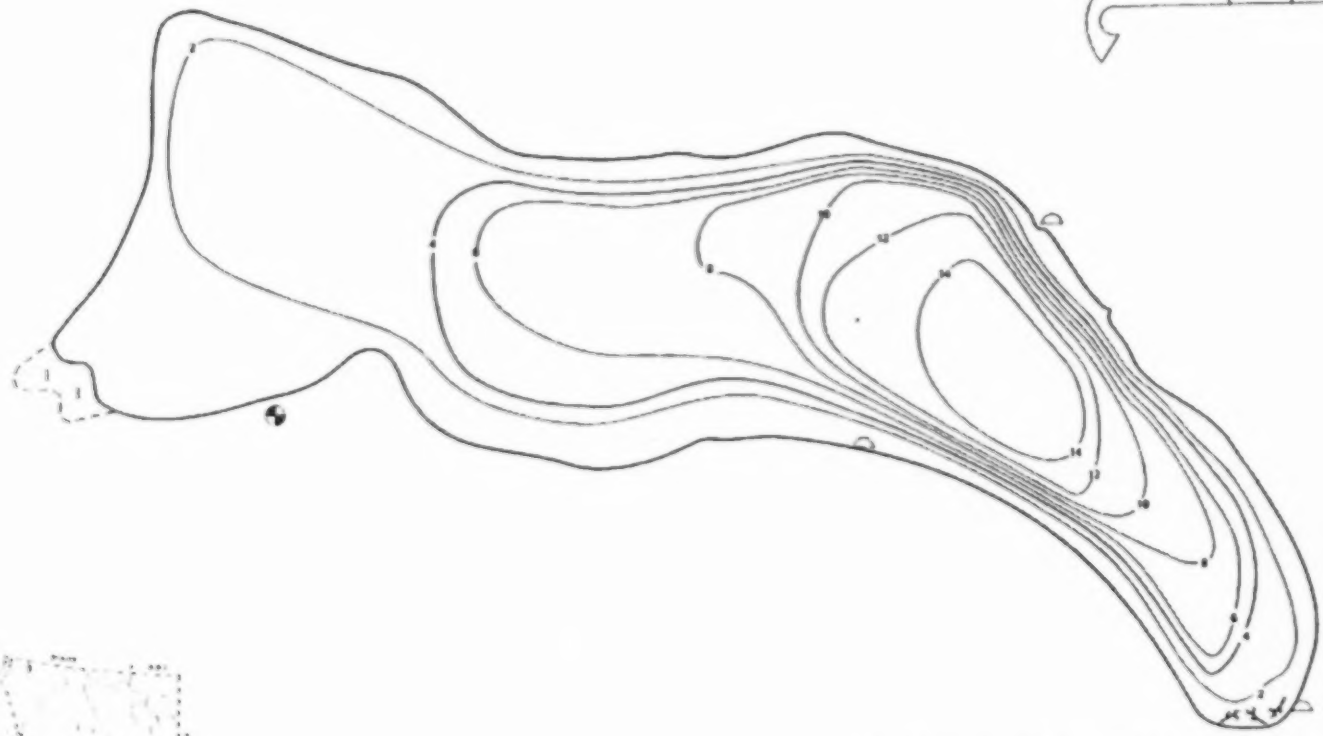
Water Chemistry Analysis

RESULTS FOR UNNAMED LAKE #10 SAMPLES

Parameter Analyzed		Units	965640-001	965640-002
**KALINITY		mg/l	24.5	31.1
DUCTIVITY		uS/cm	52	66
METALS/TOTAL (WATER-ICP)	AG	mg/l	<.01	-
	AL	mg/l	<.06	-
	AS	mg/l	<.06	-
	B	mg/l	<.01	-
	BA	mg/l	.019	-
	BE	mg/l	<.001	-
	CA	mg/l	7.3	-
	CD	mg/l	<.006	-
	CO	mg/l	<.006	-
	CR	mg/l	<.006	-
	CU	mg/l	<.006	-
	FE	mg/l	.048	-
	K	mg/l	.6	-
	MG	mg/l	1.5	-
	MN	mg/l	.01	-
	MO	mg/l	<.01	-
	NA	mg/l	.6	-
	NI	mg/l	<.02	-
	P	mg/l	<.1	-
	PB	mg/l	<.06	-
	SB	mg/l	<.06	-
	SE	mg/l	<.06	-
	SI	mg/l	.2	-
	SN	mg/l	<.06	-
	SR	mg/l	.033	-
	TI	mg/l	.002	-
	V	mg/l	<.01	-
	ZN	mg/l	.017	-
NITROGEN/AMMONIA		mg/l	.006	.51
/NITRITE+NITRATE		mg/l	.002	.003
/TOTAL		mg/l	.26	2
PH		Rel.U.	7.55	6.63
PHOSPHORUS/O-PO4		mg/l	<.001	<.001
/TOTAL		mg/l	.009	.12
/TOTAL DISSOLVED		mg/l	<.002	<.004
RESIDUE/FILTERABLE		mg/l	30	30
/NON-FILTERABLE		mg/l	<5	13
BC CLIENT STUDY CODE			20	20
SAMPLING AGENCY		EMScode	91	91
SITE IDENTIFIER/NUMBER			E223190	E223190
COLLECTION START DATE		y/m/d	96/10/09	96/10/09
UPPER DEPTH		metres	0.5	14.0
TEMPERATURE ON ARRIVAL		deg.C	8	8

Appendix B

BATHYMETRIC MAP



Reduced to
34%
of Original Size

STATISTICS AT TIME OF SURVEY

Elevation	740	m ?
Surface Area	305463	sq.m
Area above low summer	197422	sq.m
Volume	1433367	cu.m
Mean Depth	4.6	m
Maximum Depth	13.0	m
Perimeter, Mean Shore	3118	m
Perimeter, Islands	0	m
Bench Mark	3.0	m

PREPARED FOR: Ministry of Environment, Lands and Parks; BY: Jennifer Pollard, B.C. Conservation Foundation

Blue Lake

SURVEYED: June 19 1996 to June 21 1996; PLOTTED: Jan 15, 1997; DRAFTED: Completed; DATUM: DATE; APPROVED: Dave Caldow; FIELD CHIEF: